Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims

1-8. (Canceled)

9. (Currently Amended) A method for saving and restoring states of a diagnostic module, comprising:

> providing a diagnostic module adapted to change its state in response to trigger events
> > generated by a microprocessor and to halt the microprocessor in response to a
> > specified combination of trigger events and previous states;

> saving the previous state of the diagnostic module in a backup register; and

> selecting between a current state of the diagnostic module and the previous state stored
> > within the backup register based on a trigger event, wherein:

> > if the trigger event is not valid, the step of selecting comprises using the backup
> > > register to restore the diagnostic module to its previous state.

10. (Original) The method as recited in claim 9, wherein generating a trigger event comprises issuing a specified memory address.

11. (Original) The method as recited in claim 10, wherein generating a trigger event further comprises accessing a specified data value.

12. (Canceled)

13. (Previously Presented) The method as recited in claim 9, further comprising returning execution to a branch instruction upon returning from an exception associated with an instruction immediately following the branch instruction.

14. (Previously Presented) The method as recited in claim 13, further comprising generating an invalid trigger event by re-executing the branch instruction upon returning from the exception.

15. (Currently Amended) A microprocessor comprising a diagnostic module, said module comprising:

> a state machine adapted to change its internal state in response to trigger events generated by the microprocessor, and adapted to halt the microprocessor in response to a trigger event and a preceding internal state prior to the trigger event;

> a backup register adapted to save the preceding state of the state machine when it changes state in response to the trigger event; and

> state restoration logic comprising a multiplexer, which is coupled to the state machine for receiving a current state of the state machine, and coupled to the backup register for receiving the preceding state of the state machine, wherein the multiplexer is adapted to select the preceding state of the state machine for output, by useing the backup register to restore the state machine to its preceding state, if when a control signal received by the multiplexer indicates that the trigger event is invalid.

16. (Previously Presented) The microprocessor as recited in claim 15, wherein the trigger events are generated in response to a specified memory address.

17. (Previously Presented) The microprocessor as recited in claim 15, wherein the trigger events are generated in response to a specified data value.

18. (Previously Presented) The microprocessor as recited in claim 15, wherein the microprocessor further comprises an exception handler that returns execution to a branch instruction, upon returning from an exception associated with an instruction immediately following the branch instruction.

19. (Previously Presented) The microprocessor as recited in claim 15, wherein an invalid trigger event comprises a branch instruction that is re-executed upon returning from the exception handler.

20. (Previously Presented) The microprocessor as recited in claim 15, wherein the microprocessor is equipped with an instruction pipeline.

21. (Previously Presented) The microprocessor as recited in claim 15, wherein the microprocessor is equipped with an enhanced joint test action group (EJTAG) compliant interface for supplying inputs to, and receiving outputs from, the diagnostic module.

22. (Previously Presented) The microprocessor as recited in claim 15, wherein the microprocessor is adapted to perform a trace function, which outputs the current location of the microprocessor program counter while the microprocessor executes program instructions, wherein the current location of the microprocessor program counter is specified relative to a trigger event generated by the microprocessor.

23. (Canceled)

24. (Currently Amended) The microprocessor as recited in claim 23 15, wherein the multiplexer selects the current state of the state machine for output when a control signal received by the multiplexeer indicates a valid trigger event.

25. (Previously Presented) The microprocessor as recited in claim 24, wherein the microprocessor generates a valid trigger event upon accessing a breakpoint defined by a specified memory address and/or a specified data value.

26. (Canceled)

27. (Currently Amended) The microprocessor as recited in claim 26 15, wherein the microprocessor generates an invalid trigger event upon re-executing a branch instruction after returning from an exception associated with an instruction immediately following the branch instruction.

28. (Currently Amended) The microprocessor as recited in claim 26 15, further comprising an output register coupled between the multiplexer and the backup register, wherein the output register is adapted for storing the output selected from the multiplexer and for forwarding the output to the backup register for storage therein.

29. (New) The method as recited in claim 9, wherein if the trigger event is valid, the step of selecting comprises using the current state of the diagnostic module as output.